1862MNRAS..22..160M

On Comet II., 1861, *and on some other Comets.*
By Dr. Mackay.

(*Communicated by Prof. C. P. Smyth.*)

The Rev. Dr. Mackay, Missionary, Chinsurah, Bengal, has communicated through Prof. C. Piazzi Smyth, his (Dr. Mackay's) observations of the Comet II., or the Great Comet, 1861, and his computation of two sets of elements of the orbit, as follows,—

Ascending Node	279° 2′	278° 59′ 30″
Inclination	85° 33′	85° 29′ 32″
Perihelion dist.	·825	·8267
,, long.	249° 38′	249° 51′
,, passage	June 11^{d} 20^{h}	June 11^{d} 23^{h}

Motion direct.

The first was computed from his own observations of 1861, July 5, 10, 15, and was published in India on July 25th; the second one was computed in August, substituting a French observation of June 30th, printed in the *Journal des Debats*, for the first of his own observations.

The observations are remarkable instances of what may be done with "a sextant and an old ship's chronometer." The Doctor writes, "My plan of observing was, to take every available evening a series of the Comet's distances from *Vega* and *Arcturus*, as near as possible to a mean of 9^{h} 5^{m} 33^{s}, Chinsurah Mean Time (3^{h} 12^{m} G.M.T.), and from these to compute the Comet's Right Ascension and Declination. With the found Right Ascension and Declination I computed its distance from a third star, η *Ursæ Majoris*, which I also measured; and it was only when the computed and observed distances agreed, or slightly differed, (say 1′) that I considered the night's work good.

"In October 1858, with the same sextant, but with better eyesight and longer intervals (6th, 18th, and 30th), I found the elements of the Comet of 1858,

	° ′
Perihelion long.	37 4
,, dist.	·5753
,, passage	Sept. 29^{d} 18^{h} 21^{m}
Long. ascending Node	165° 15′
Inclination	63° 39′

Motion retrograde.

1862MNRAS..22..160M

"These were published in the *Friend of India*, about a month before receiving the European determination, thus,

Perihelion long.	36° 13′
,, dist.	·579
,, passage	Sept. 29^{d} 23^{h}
Longitude of Node	165° 19′
Inclination	63° 2′

Motion retrograde."

The following is the Doctor's printed local communication, published in the *Friend of India*, July 25, 1861, which, amongst other interesting particulars, contains his identification of the Comet with Comet I., 1781, computed by Mechain.

"With very considerable labour, by three reduced sextant observations of July 5th, 10th, and 15th, I have computed the following elements for the Comet. They can be considered only as approximate, as my sight is failing, and the intervals rather shorter than I could wish:—

Perihelion long.	249° 38′
,, dist.	·825
,, passage	June 11^{d} 20^{h}·7
Long. ascending Node	99° 1′
Inclination	85° 33′

Motion direct.

"This differs considerably from Hind's May elements, as given in my former letter; but with an orbit almost perpendicular to the ecliptic, such differences are to be expected.

"From these elements I find that the Comet on the evening of July 5th was only eleven millions of miles from the Earth. Probably (for I have not calculated it) it was not much more than five millions, about the beginning of the month. This will account satisfactorily for its immense tail, and great velocity. I should be very thankful for any observations before the 5th and after the 15th. A week or two more will bring the determination from Europe of what the elements really are.

"Hind gives a group of four comets, with large inclinations, direct motions, and perihelion distances varying from ·7 to ·8, ·9, and 1, for which periods have been computed of about 75 years. Another will now be added to the group; for I have no doubt that this comet is identical with the 1st of 1781, of which the elements were found by Mechain.

1862MNRAS..22..162.

"They are as follows:

Perihelion long.	239°	Hind has 243
,, dist.	·755	
,, passage	July 7^d	
Ascending Node	83°	
Inclination	81°	

Motion direct.

If so, a comet with a known period of 80 years will take rank with Halley's. If they could be found, it would be interesting to recompute Mechain's calculations.

"On looking through Hind's list, I find a Comet in 1797 not very unlike, and another in 68 B.C., which I feel strongly disposed to identify with our Comet. From the obscure notices of the period in the Chinese annals, it appears to have had a perihelion distance of 8, and an inclination of 70°. Adding 68 to 1861, we have 1929, a near enough multiple of 80, when it is considered how much the cometary periods vary.

"No doubt all this has been discovered, and much more satisfactorily, in Europe; but it is new at least in this country.

"W. S. M."

"*Chinsurah, 19th July*, 1861.

"My observations were,—

		R.A.	N. Decl.
	h m	° ′ ″	° ′ ″
July 5	3 12	172 31 30	66 40 20
10	3 12	206 10 15	59 41 17
15	3 12	215 41 0	54 50 32

The time is Greenwich mean time."

Extract of a Letter from Mr. Lassell.

(*Communicated by Prof. De Morgan.*)

"The principal work, however, I have hitherto done is the perfectly successful erection of the four-foot Equatoreal, on a most favourable site near Fort Tigné, on the north side of the Quarantine Harbour in this island. It differs a little from the lithographic drawing in the possession of the Society, as it is now erected in the latitude for which it was constructed, and not, as in that sketch, with the polar axis inserted in an excavation, to allow of its temporary use in the latitude of Liver-